

# CANADIAN GEOGRAPHICAL JOURNAL

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Colour photograph by W. V. Crich

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*Looking north across the Athabasca River from a point east of Pocahontas.  
Boule Range in background.*

# The Yellowhead Pass

by ROBERT J. C. STEAD. *Photographs by GORDON M. DALLYN*

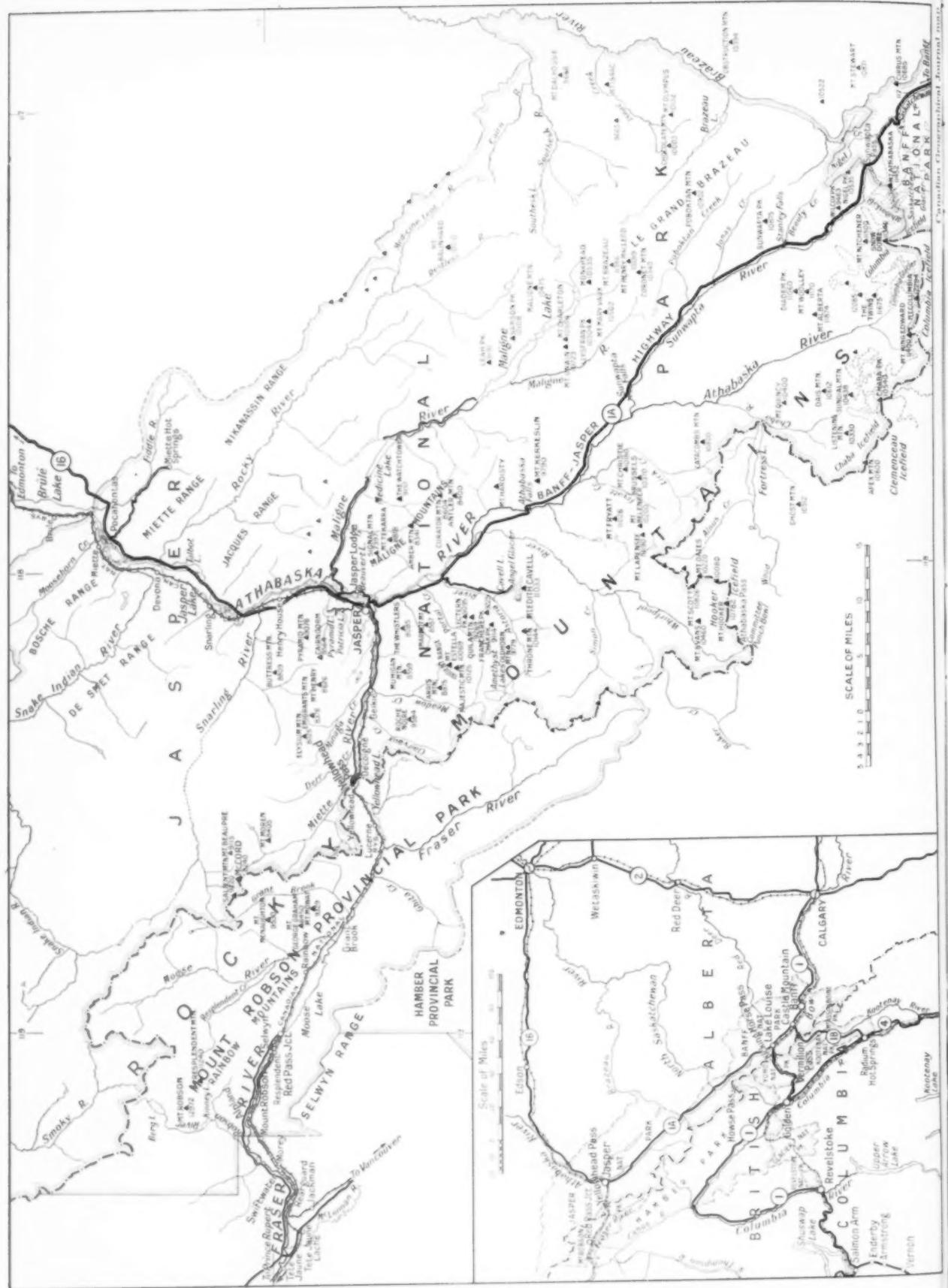
**T**HE ROCKY MOUNTAIN BARRIER, which separates the west coast area from the rest of Canada, is penetrated by two principal traffic arteries. One of these, the Kicking Horse Pass, described in the June 1948 number of the *Canadian Geographical Journal* under the title, "The Great Divide", approaches the mountains from the southern part of Alberta by way of the Bow River Valley; the other, subject of this article, enters by the Athabasca River in the north central part of Alberta. While somewhat less spectacular than the southern pass it has a greater background of historic interest and commands so much scenic grandeur that it is a popular route of travel for thousands of Canadians and a continually rising tide of visitors from other lands.

Traffic from the east through this pass, whether by rail or road, converges at Edmonton and moves almost directly westward through a lightly-timbered and mostly level country to Jasper National Park, a distance of 204 miles. Another 32 miles bring the traveller to the town of Jasper, headquarters of the park and a Canadian National Railways centre of some importance. The ascent is from an altitude of 2,185 feet above sea-level at Edmonton to 3,470 feet at Jasper, a net increase of 1,285 feet in 236 miles, or an average climb of less than six feet to the mile—an amazingly easy approach to the heart of the Rockies. The ascent continues to Yellowhead, British Columbia, where an altitude of 3,717 feet above sea-level is attained. This is the highest point on the route and makes the Yellowhead Pass the lowest across the Rockies on this continent. On the Kicking Horse route the extreme rail altitude is 5,337 feet.

The physical features of the Yellowhead Pass indicated by the above altitudes give rise to the question—why was it not selected

as the original rail route through the mountains? As a matter of fact, before the building of the Canadian Pacific Railway it was generally expected that it would follow the northern course, and Walter Moberly actually surveyed the Howse, Athabasca, and Yellowhead Passes for the C.P.R. Eventually, however, it was decided to use the southern route. Its steeper gradients and more difficult engineering were to some extent offset by the fact that it was nearly 100 miles shorter, but perhaps the main consideration was a political one—that the line should be not too far from the United States border. A large and fertile area in the southern part of the prairies, not served by Canadian transportation, might have led at least to the commercial absorption of that part of the country by the neighbouring republic.

When at last railways did enter the mountains via the Athabasca route they were following a course known for more than a century by traders, trappers, and explorers as the easiest way to the Pacific Coast. The Athabasca Trail has its significant place in Canadian pioneer history. As early as 1793 Sir Alexander Mackenzie traversed this overland route. In 1807 David Thompson, another explorer whose name occupies a very honoured place in Canadian history, crossed the mountains through what is known as Howse Pass, and in following years probably made several trips by this route. Thompson had been at first employed by the Hudson's Bay Company, but changed his allegiance to their great rivals, the North West Company. His activities led his former employers to despatch Joseph Howse to keep a check on Thompson's movements. It was in honour of this Joseph Howse that Howse Pass was named. The importance of the route to both companies is indicated by the fact that



for many years the fur brigades moved along the Athabasca Trail, in those times the only feasible land connection between eastern Canada and the Pacific Coast.

Soon after Thompson came Gabriele Franchère, Alex Ross, and Ross Cox, employees of John Jacob Astor's Pacific Fur Company, a United States concern which for a time made a strenuous bid for the fur business of the Far West, but was eventually taken over by the North West Company. In 1824-25 Sir George Simpson made a trip east-bound through the pass, and near the summit paused by a pool where, it is said, a bottle of wine was used to celebrate the occasion. From this incident the pool took the name, "The Committee's Punch Bowl", which it has retained to this day. Thomas Drummond, a naturalist, made the trip in 1826 and was followed in 1827 by Edward Ermatinger. A member of Ermatinger's party was a botanist, David Douglas, whose name has been commemorated in the Douglas fir tree. Other early travellers of note along the Athabasca Trail were James (afterwards Sir James) Douglas, the first Governor of Vancouver Island; Paul Kane, the artist; Father de Smet, whose name is preserved in the De Smet Mountains; Dr. James Hector, geologist to the Palliser expedition and explorer of the Kicking Horse Pass, and a procession of others leading right down to the coming of the steel. Few routes in Canada combine the scenic with the romantic as does the Athabasca Trail, and perhaps no other is so redolent with the memories of men who faced the hardships and perils of mountain travel long before the day of the sleeping-car and the automobile.

Railway connection with Jasper was ultimately established, not by one company, but by two. The Canadian Northern Railway built its transcontinental line through the area and by way of the North Thompson and Fraser Rivers to Vancouver; the Grand Trunk Pacific followed the same route from Edmonton to the place now known as Red Pass Junction, 44 miles west of the town of Jasper, from which point it swung in a

northwesterly direction to its western terminus at Prince Rupert. For hundreds of miles the two railways were practically within a stone's throw of each other—a duplication of services which can only be explained as the measure of Canadian optimism in the early years of this century. Eventually both roads were absorbed in the Canadian National Railways system. During World War I many of the steel rails of one of the duplicating lines were taken up and shipped to Europe for military purposes. They never were re-laid, and the road-bed became available for highway purposes.

The scenic and historic interest of the area led to the establishment, in 1907, of Jasper National Park. Its area of 4,200 square miles—twice the size of the Province of Prince Edward Island—makes it the largest of Canada's national parks open to tourist travel. (Wood Mountain National Park, in Alberta and the Northwest Territories, is much larger, but at present is really a wild animal reserve rather than a national park in the ordinary sense of the word.) Not much is known of the origin of the name Jasper. Originally the area was known as the Glittering Mountains—a not inappropriate title for one of the greatest glacier-bearing districts on the continent. "Local legends declare that the name was derived from a certain Jasper Haws, Hawes, or Hawse—the name is variously spelt in the old records—who was in charge of the Hudson's Bay Company's post at the north end of Brûlé Lake from about the year 1813... On the old maps the post first appears as Jasper's House, later as Jasper House... Why he should have so impressed himself on the whole region there is little to show... There are no records which afford a satisfactory explanation. Hawse remains an almost legendary figure, immortalized by his unusual Christian name. When the creation of a national park was under consideration in 1907 several designations were suggested, of which "Athabasca Park" and "Jasper Park" were the most favoured. The choice finally fell, most happily in the belief of many, upon Jasper Park".\*

\*Miss M. B. Williams, in her book, *Jasper National Park*.

The park is located mainly in mountain-bordered valleys lying in a northwest and southeast direction, its southeasterly extremity resting against Banff National Park, with which it is a geographical unit, although divided from it for administrative purposes. The main line of the Canadian National Railways crosses the park, and motorists may enter by Highway Number 16 from Edmonton, or by the Banff-Jasper Highway from the southeast. The Banff-Jasper Highway connects with the Trans-Canada Highway and, through it, with various highways in southern British Columbia and Alberta and the highway system of the United States.

As one approaches the Jasper area by train or highway from Edmonton, the level, lightly-timbered country gradually gives

way to heavier forests and more mountainous formations. Railway and highway both parallel the Athabasca River throughout most of the course. Entry into the park marks also entry into a territory in which all wild life is strictly protected, with the result that the animals have largely lost their fear of man, and may frequently be seen at close quarters. The motorist does well to keep this fact in mind, as he may find the highway blocked, but with no hostile intent. Most playful of all are the bears, which are a never-failing source of interest to visitors, especially children. But, playful or not, bears are still bears, and are best enjoyed at a modest distance. The fact that no hunting is allowed in the park results in a considerable overflow of game into surrounding areas, and Jasper is used





*Two Albertan sentinels of the Athabasca Valley—Roche Ronde (above), and Roche Miette (left), showing precipitous north face, the cliff formed by the upthrust of fossiliferous Devonian limestone. Note the characteristic benches along the Athabasca River which, here as elsewhere, have proved such a boon to railroad and highway builders.*

as a base for many big game expeditions.

Soon after entering the park a highway swings southeastward, which, if followed, takes the traveller to Miette Hot Springs, 38 miles from Jasper town. The waters of the springs are among the hottest in the

Rockies and are credited with having pronounced medicinal qualities. The Government has provided complete pool and bath-house facilities, and a public camp-ground and modern bungalow camp are available. Mountains of the Miette Range,



*Left:—Glimpse of Mount Perdrix from Brûlé Station.*

*Below:—Looking south across Brûlé Lake. Mount Perdrix (left), is near the east entrance to Jasper Park. The upper part of the mountain shows a closely folded syncline in Devonian strata. Fiddle Range is in the right background while Miette Range forms the distant sky-line.*





*Revealing view of Mount Perdrix on the southeast side of the Athabasca Valley. Here the artist and the scientist may share a camp and be content. Here the processes of mountain building are an open book to the geologist and a challenge to the layman with mysteries to be solved. No Hollywood set this—but nature's handiwork, millions of years in the making. Limestone beds deposited under water, lifted by mountain-building forces to greet the clouds aloft, and carved into cliffs, valleys, crevices, benches; with forest-clad slopes and their attendant mountain flowers, birds and animal life; each has a thrilling story to tell; while fossils bear documentary records of their time and life, and of the kind of world they lived in—in the distant past.*

which guard the highway from the southwest, rise to heights of approximately 8,000 feet.

From the junction with the Miette Hot Springs Highway the road follows closely the Athabasca River, frequently expanded

into lakes. Chief of these is Jasper Lake, which, at an altitude of 3,287 feet, lies between Jacques Range on the south and De Smet Range on the north, and receives the waters of Rocky River from the southeast. The substantial Snake Indian River joins the



*Solitude and reflections, Lac Beauvert, Jasper. The Whistlers, elevation 8,085 feet, in the background.*

Athabasca from the northwest at a point a short distance below Jasper Lake. Mountains along the route from Jasper Lake to Jasper town rise generally to altitudes of about 8,000 feet, but as the valley is relatively low they present a greater mass to the eye than if they rose from a higher base terrain. Pyramid Mountain, (9,076 feet),

dominates the scene to the northward, and Mount Cairngorm, Mount Henry, Emigrants Mountain, and Elysium Mountain, (all over 8,000 feet high) are strung like a row of fortifications guarding the valley.

The town of Jasper is the principal centre within the park. It contains several year-round hotels, and about four miles

*Looking west across Lac Beauvert to Miette River Valley which the railway climbs on its way to Yellowhead Pass from Jasper.*

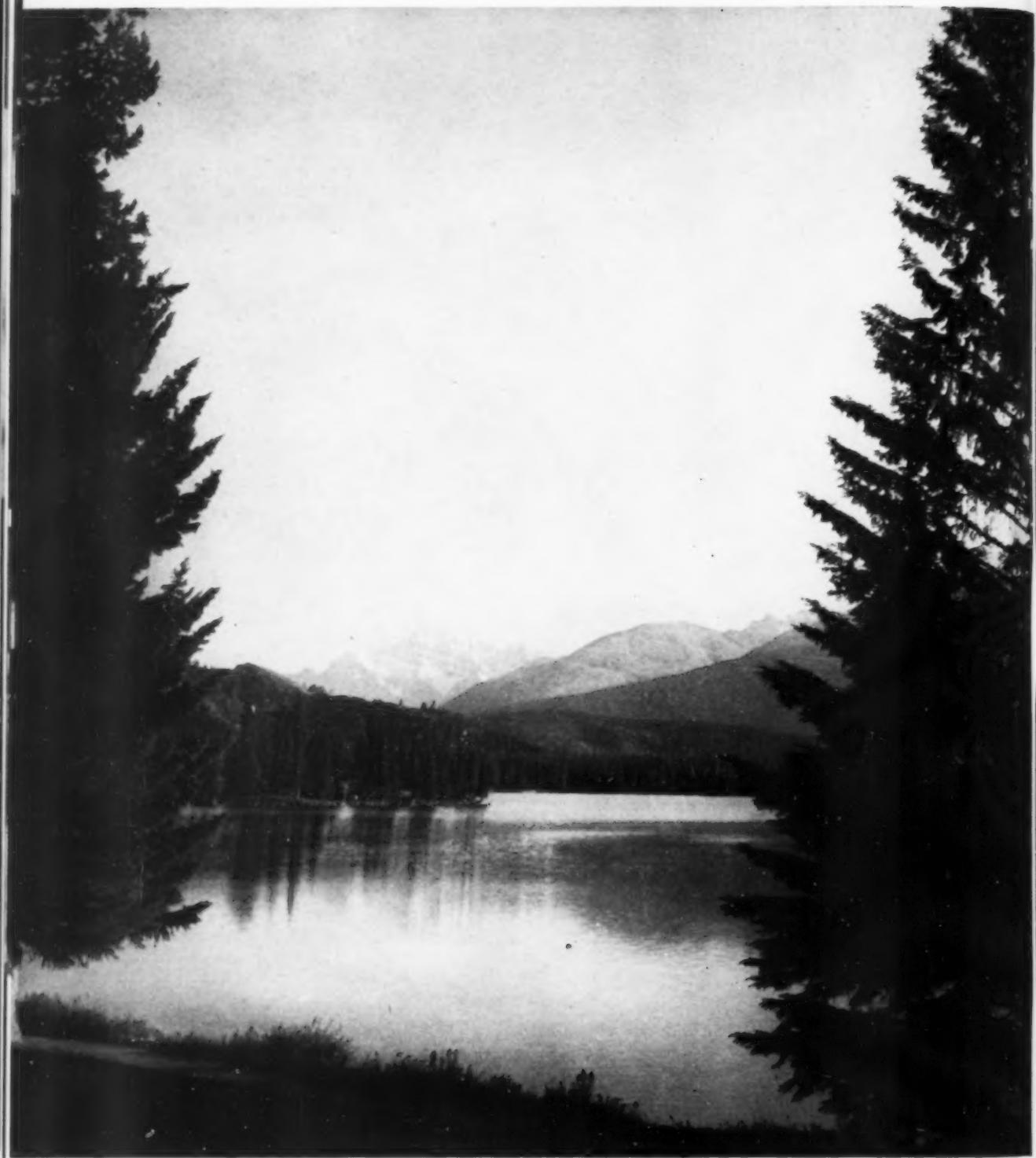


away is Jasper Park Lodge, operated by the Canadian National Railways. Located on beautiful Lac Beauvert and commanding magnificent vistas of purple-bodied, snow-capped mountains, it is one of the most famous hosteries on the continent. On various other locations convenient to Jasper are bungalow camps and housekeeping cabins designed to match the incomes of various types of tourists.

A notable feature of Jasper Park is the spaciousness of the valleys. The mountains are mostly set back at a distance which commands an impressive perspective, and for those who wish to make closer examination good highways are available. Most famous of these is the Banff-Jasper Highway, which connects with the Trans-Canada Highway at Lake Louise, and so with the town of Banff, a total distance of 186 miles. This highway was opened to travel in 1940 and commands much of the finest scenery on the continent. It follows the valleys of the Athabasca and Sunwapta Rivers in a southeasterly direction from Jasper and enters Banff National Park by Sunwapta Pass at an altitude of 6,675 feet. Its most distinguishing feature is the Columbia Ice-field, estimated to cover an area of about 150 square miles and rising to an altitude of 11,340 feet, but its whole route is lined with mountains, glaciers, rivers, waterfalls, and lakes.

While the Columbia Ice-field is perhaps the greatest single attraction in Jasper Park there are many other points of outstanding interest. Mount Edith Cavell, named for the heroic British nurse who lost her life in World War I, is reached by a road which branches off from the Banff-Jasper Highway. The route commands a procession of mountains—The Whistlers, Signal Mountain, Mount Tekarra, Mount Curator, Antler Mountain, Mount Hardisty, Mount Kerkeslin, Mount Fryatt, Mount Aquila, and Franchère Peak either guard the route or stand as backdrops to magnificent vistas which open from it. The trip is climaxed by the impressive grandeur of Mount Edith Cavell rising to a height of 11,033 feet and reflected in a little mountain lake also bearing the heroine's name, with Angel Glacier clinging to its rugged sides. A little farther along the Astoria River, Throne Mountain (10,144 feet) provides a companion setting to Mount Edith Cavell.

Although most famous for its mountains and glaciers, the Jasper area presents a panorama of rivers, lakes and waterfalls sufficient to establish its position among the great beauty resorts of the continent. Maligne Lake and Medicine Lake, reached by a highway running southeastward from the town; Athabasca and Sunwapta Falls on the Banff-Jasper Highway, and the whole course of the Athabasca River and



Mount Edith Cavell as viewed across Lac Beauvert. The mountain, fifteen miles distant, which has an elevation of 11,033 feet above sea level, rises 7,677 feet above the lake level.

*Scenes at Jasper Park Lodge, where in tranquil ease one may enjoy the mountain scene or watch the gambols of pert squirrels and the rolling gait of the black bear nosing about on a nearby stretch of lush lawn.*



its numerous tributaries present a magnificence of variety and charm which has to be seen to be even partially appreciated.

About 17 miles west of Jasper the railway reaches Yellowhead, highest point in the pass, and marking the boundary between Alberta and British Columbia. The railway has followed the Miette River, which joins

the Athabasca at Jasper, but now it begins to descend Yellowhead Creek to Yellowhead Lake and presently joins the Fraser River, at this point only a modest stream giving little hint of the turbulent majesty of its lower reaches. Jasper National Park has now been left behind, but Mount Robson Provincial Park continues the magnificent array of mountains, rivers, and lakes. Mount Robson itself, highest peak in the Canadian Rockies, towers 12,972 feet heavenward, and nearby Mount Resplendent rises to 11,240 feet. The Robson River joins the Fraser a short distance beyond the western boundary of Mount Robson Park, and the altitude continues to descend by easy stages all the way to Vancouver.

Whether west-bound or east-bound, the panorama of beauty ascending to and descending from the Yellowhead Pass cannot fail to stir any receptive soul. The Canadian is filled with humble pride in the majesty and variety of his own country, and the visitor from other lands finds in it that note of universal appeal which over-rides all racial and national distinctions.

See also in the *Canadian Geographical Journal* "Geology of the National Parks of Canada in the Rockies and Selkirks" by B. R. MacKay, February 1940; "The Banff-Jasper Highway" by E. E. Bishop, January 1940; "Canada's Mountain Playgrounds" by R. J. C. Stead, June 1937.

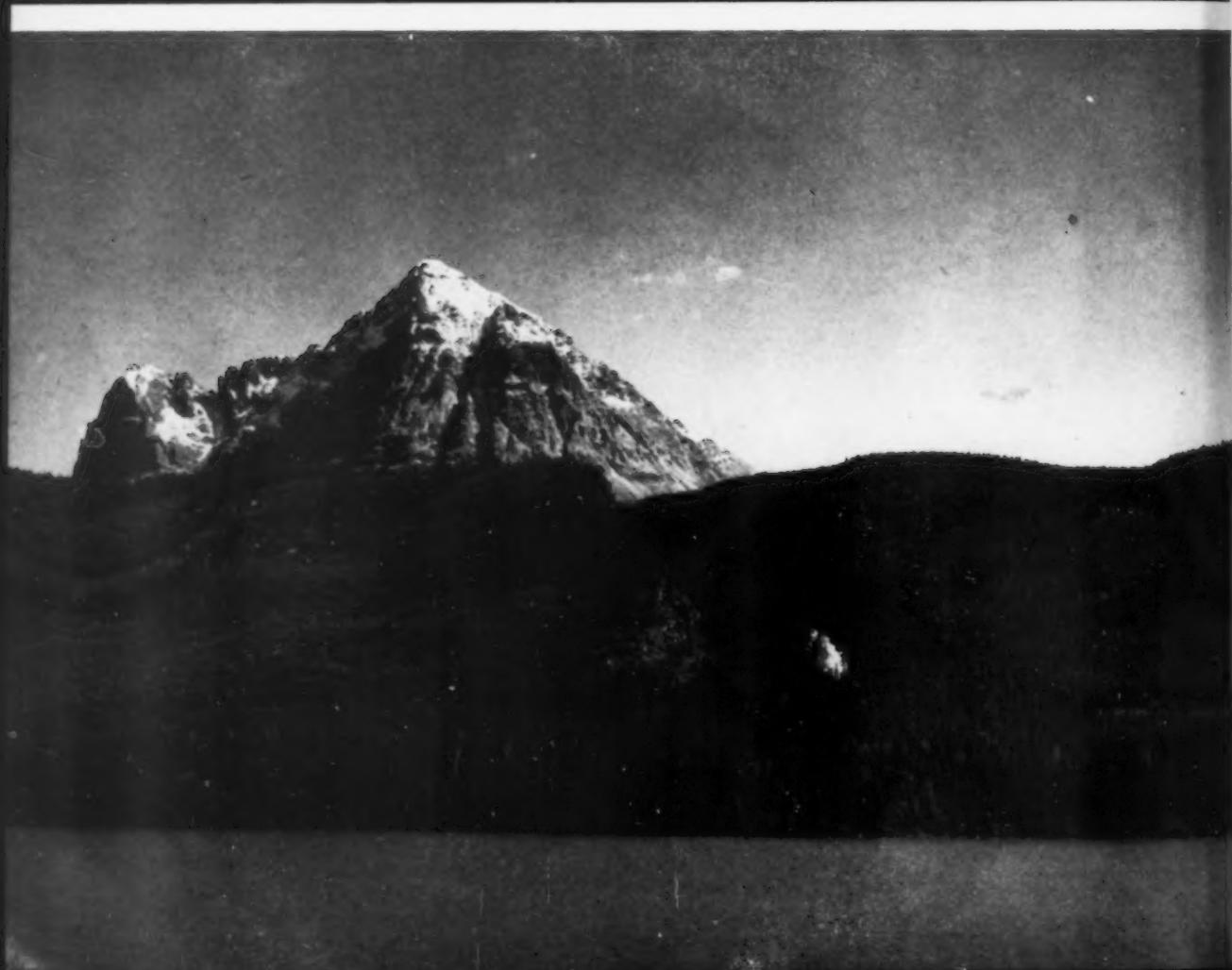


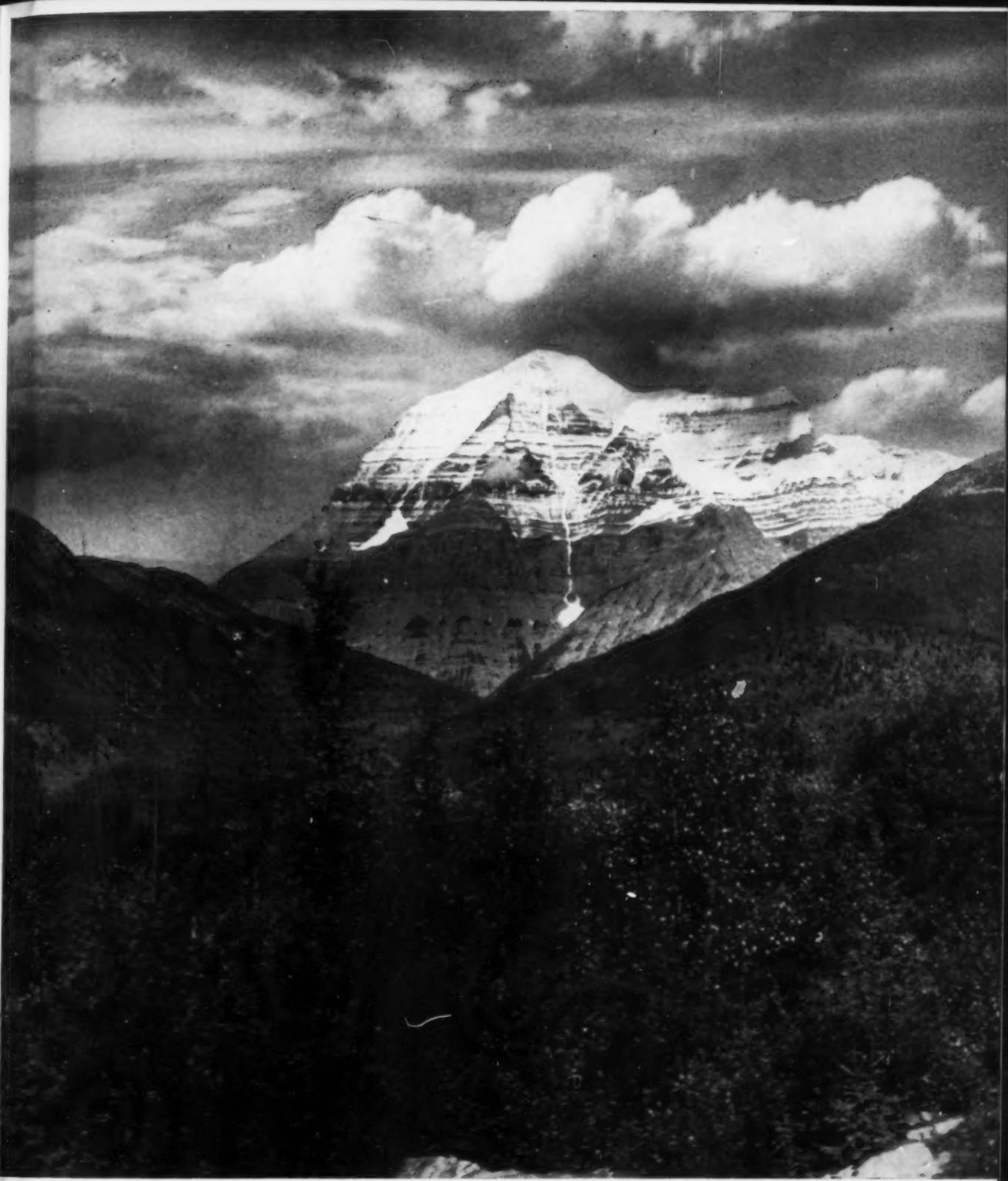


*Roche Miette, the upper part of which has been carved in massive, cliff-forming limestone of Devonian age. This structure rests on softer beds of Devonian and Cambrian ages. The cliff-forming nature of the upper stratum is responsible for the extraordinarily precipitous nature of the mountain, forming a landmark visible for great distances.*

*Top left:—View across Jasper Lake at the east side of Roche Miette.*

*Bottom left:—Looking south across the Athabasca River from the south end of Brûlé Lake. Mount Perdrix at left, Roche Miette at right.*





*For many miles—north, south, east and west—a chorus of lesser mountain peaks command attention for the entrance of minor stars such as Mt. Fitzwilliam (left)—then the amphitheatre of the Fraser sets the stage for entry of the star, Mount Robson, mighty giant of the mountains, towering 12,872 feet, companion of the clouds which customarily veil her snow-capped peaks.*



## FLOWER SERIES — Part II

Photographs and Notes by W. V. CRICH

### BLACK-EYED SUSAN—*Rudbeckia hirta*

**C**LUMPS of Black-eyed Susans with their stiff, bristly stems and heads of showy florets, brighten our prairies and meadows from June to September.

The Black-eyed Susan is a biennial. It is not a native of Eastern Canada but originated in our Western cloverfields and was introduced to the east by seed mixed with clover seed.

To the farmer it is a weed, but many rudbeckias find their places in flower gardens, where they are much admired as coneflowers.

The Black-eyed Susan with its madder purple or chocolate brown disk florets and its golden ray florets is found from Ontario to Florida, and west to Texas, Colorado, and Manitoba. The deep golden-yellow ray flowers are neutral, having neither stamens nor pistils; like the ray flowers of the ox-eye daisy, they are simply an advertising agency.

Because rudbeckias are so conspicuous, they form the landing field for almost any insect on wings which inhabits our meadows and hayfields.

### OX-EYE DAISY—*Chrysanthemum leucanthemum*

THE common, white daisy is perhaps the best known of all the common weeds found in the farmer's fields or along his fences. In spite of the fact that it is often called the "farmer's curse" and fills him with dismay, it is a prime favourite of children and artists. Maybe the farmer is trying to capitalize on his misfortune, because small bunches are appearing for sale in the city markets. And why not? The flower is the acme of simplicity and decorative beauty, and clusters of them fill the flower-lover with delight as they form a snowy mantle over the meadows in June.

The ox-eye daisy is not a native of America but, like so many of our meadow and pasture plants, was introduced from Europe in the early days of colonization. It is now thoroughly established on the northeastern coast where it has found America so much to its liking. It flowers from June to September when happy farm children are turned out for their holidays in the meadows. Here they make daisy chains, or discover if their bashful, barefoot playmate "loves them or loves them not".

The daisy is not a single flower. Each of its so-called white "petals" is a small flower or floret, whose open, strap-shaped corolla has grown large, white and showy to attract and advertise its wares to insect visitors. The yellow centre is composed of hundreds of tiny tubular-shaped flowers or florets all huddled together as closely as they can be packed. These are the seed-producing flowers, and offer nectar to the many insects that visit them, attracted by their more showy sisters in the outer ring.





Photographs and Notes by W. V. CRICH

BLOODROOT — *Sanguinaria canadensis*

THE poppy family, to which the Bloodroot belongs, is characterized by its milky or coloured sap. If you were to break off a leaf or stem of a Bloodroot plant, you would immediately discover the reason for its name; for the sap is a dull orange colour. It is also acrid and astringent. The dried rhizome and roots are used medicinally.

The Bloodroot is a beautiful but very fragile flower. The sepals fall off when the flower bud opens. The petals open up flatly when the morning light reaches them, and then close up again before nightfall.

This flower is common nearly everywhere. It is not one that is gathered ruthlessly by thoughtless flower vandals, because of its fragile nature. It soon withers after picking, and the petals often fall off at the merest touch. For this reason it is holding its own in nearly every woods and in the shelter of farmland fences.

Like the other members of the poppy family the flower is quite conspicuous. As the plants break through the ground in early April or May the budding flower is enclosed by the blue-olive-green leaf which forms a protecting cylinder around it. The setting for the accompanying photograph could hardly be more picturesque. The plants are nestled at the base of a pine stump, part of one of the few stump fences remaining in this section of Ontario.

JACK-IN-THE-PULPIT — *Arisaema triphyllum* (Top right)

THE Jack-in-the-pulpit with its beautiful green and purple-brown striped spathe belongs to the arum family, along with two other common and interesting plants, the Skunk Cabbage and the Water Arum. Generally the plant prefers shaded, wet woods and is found blooming during May and June in the vicinity of Toronto.

The plant originates from a rounded acrid corm. The Indians used to boil or dry this corm to extract the blistering, stinging juice. It was then edible. Thus the plant gets its other name, the Indian Turnip. Nearly every country boy at some time or another has been inveigled into eating the raw, starchy-tasting corm. It tastes very much like a piece of raw potato, but that is only for the first half minute. Then comes a terrific burning and blistering sensation which lasts for quite some time. When one has once eaten a raw Indian Turnip, one never forgets the experience.

The real flowers of the plant are very small, situated at the base of the smooth, glossy column or spadix inside the coloured spathe or hood. Fertilization is assisted by minute insects. These have little difficulty in entering but the way out is more complicated and many perish before discovering the gap in the flap where the spathe folds together in front. Some persevering gnats do discover the exit, and then enter another plant where they leave the vital pollen on the small florals awaiting its coming. The pistillate flowers produce a handsome clustering berrylike fruit, after the spathe has withered and dropped off. This fruit is a brilliant glossy green at first, but in late August it ripens and becomes bright red.

MARSH MARIGOLD — *Caltha palustris* (Bottom right)

NEARLY everyone knows the Marsh Marigold with its dense clusters of golden-yellow flowers, but few people realize what delicious "greens" the young leaves make if gathered before the flower buds



open. The Marsh Marigold is a very conspicuous plant in early spring in swamps and wet meadows. Marsh Marigolds are often wrongly called Cowslips or even Buttercups. The commonness of misnomers like this is the main reason why botanists insist on calling all plants by their scientific names; for then there can be no mistakes as to what plants they mean. Also the scientific name is a descriptive name, for example: *caltha* means cup, and *palus* a marsh, hence—marsh cup.

The Marsh Marigold is a stocky plant with a thick, hollow stem and kidney-shaped deep green leaves which add much to the beauty of the marsh, even after the flowers have withered away. The clusters of leaves also form suitable nesting places for rails and swamp sparrows.



#### FOAMFLOWER or FALSE MITREWORT—*Tiarella cordifolia*

Photographs and Notes by W. V. CRICH

**F**EATHERY white Foamflowers are most conspicuous in rich woodlands when seen against a nearby tree trunk as in the illustration. They are a relative of the true Mitrewort, or Bishop's Cap, and have similar foliage. The flowering scapes are leafless and are from five to twelve inches in height. The petals are white and oblong, and many are clustered along the scape. In the true Mitrewort the flowers are more distantly scattered, and their small, fine petals are deeply cut like a fringe. Both species bloom in late April or early June, and this gives the amateur botanist an excellent opportunity to compare the two plants.

The leaves are quite decorative and adorn the woodland floor long after the flowers have withered and died.

#### CANADA VIOLET—*Viola canadensis* (Top right)

**T**HE Canada Violet is found in hilly woods and mountainous forests from New Brunswick to Saskatchewan and south to South Carolina and Alabama.

This is a leafy-stemmed violet with a sweet scent and heart-shaped, deep green leaves. The flowers spring from forking leaf stalks. The petals are white inside, and purplish outside. The lower petal is tinged with yellow and marked by dark lines, as shown in the photograph.

The plants are tall, often a foot high. Usually several are seen together springing up from a perennial root. The basal leaves are numerous and have long petioles. Flowers appear all through the season from May to July.

#### BUNCHBERRY—*Cornus canadensis* (Bottom right)

**T**HE Bunchberry is a dainty little plant common in woods where the soil is moist, and on recently cleared land. The specimens seen in the photograph were found on the shore of the Pilgrim Island, a small island in the St. Lawrence River opposite Trois Pistolets. Although bunchberries generally flower in May or June, late specimens are sometimes found in the fall. Several such plants were found flowering after an early snowfall in the Catskill Mountains in October.

Accompanied by Twinflower and Goldthread, they form a charming carpet in the woods. The flowers are greenish or yellowish and very small. They are clustered in a close head, surrounded by a showy involucle of four white bracts. The entire arrangement appears at first glance to be a single flower. Later on, the flowers disappear and are replaced by brilliant scarlet berries which form a close, globose cluster.





Part of the compact well-built section of Zanzibar City. The old houses are all constructed of coral. In the centre may be seen the cathedral of Zanzibar, built on the site of the old slave market.

Typical of the narrow streets of old Zanzibar is this view of Portuguese Street where many of the tailors and boot-makers have their shops.

# Trades of Zanzibar

by E. O. HOPPE

Photos by Fergus Wilson except where otherwise credited.

**T**HE FRAGRANT aroma of spices fills the air as the steamer approaches the coastline of Zanzibar\*, long before the plain red flag which flies over the palace of the Sultan is sighted. His Highness Seyyid Sir Khalifa bin Harub is a descendant of the great Imam of Muscat, Seyyid Said, who established his capital in Zanzibar in 1832 and to whose foresight it is due that the island's clove industry has attracted the commerce of the world and has practically become a monopoly.

It is generally held that the first clove trees introduced into Zanzibar about 1818 came from Mauritius. The clove trees from



*Beautiful carving adorns the doorways. The brass studs are a survival from the days when war elephants were employed to break down heavy doors.*



\*Zanzibar is a sultanate and British protectorate. The sultanate comprises the islands of Zanzibar and Pemba, some adjacent small islands, and a coastal strip of mainland of East Africa administered by the Kenya Protectorate.

the first took very kindly to their new home and less than twenty years later people in Zanzibar were giving up their coconut plantations in favour of the newcomer. The phenomenal success of the present-day clove trade is, however, directly due to the initiative of Seyyid Said, who realized that clove cultivation promised a prosperous future for his realm. By utilizing the knowledge and resources of his Arab subjects and by compelling plantation owners to plant cloves, he established an industry so successful that it might well be said that he required no other monument to his memory. Today Zanzibar and the neighbouring island of Pemba produce eighty per cent of the world's clove supply.

In the two islands there are about four million trees. The evergreen glades of stately clove trees are a delight to the eye as well as a satisfaction to the nose. Conical in shape, the trees reach a height of thirty to forty feet in Zanzibar and fifty feet in Pemba,



## THE CLOVE INDUSTRY



The clusters of buds are gathered before flowering to provide the clove of commerce. Good quality cloves must retain the "head", be of good size and of a rich deep brown colour. For the past twenty years government quality and grade standards have been carefully maintained. Centre picture shows government "samplers" extracting samples of cloves for examination prior to sale in the local market.





their thick glossy leaves not unlike those of the laurel. Leaves, branches and flowers all exude the sweet acrid perfume which is so familiar to us, but the clove of commerce is the dried bud only, picked just before the pinkish mauve blossoms open out to a deep red. Harvesting in the clove plantations, which takes place twice yearly, July to October and December to January, is a lively and colourful affair in a good season. The beating of a drum at break of day is the call to work for clove pickers. Chattering children come with their parents, eager to help in gathering the fragrant clusters of buds that are within reach of the hooked sticks with which both women and children are equipped.

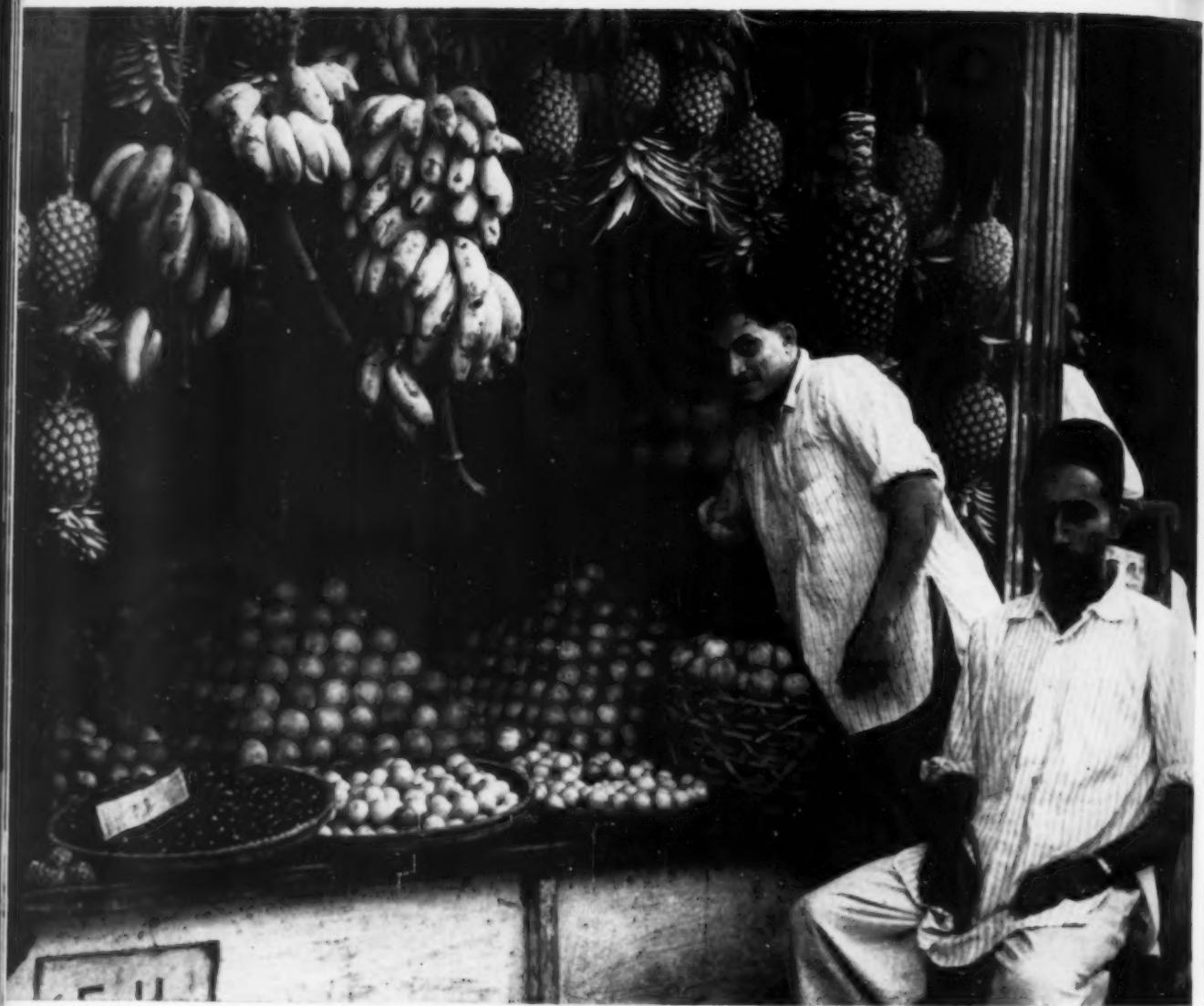
Cloves are mostly used for culinary purposes, but have many other applications. The distilled oil is employed in leather-making, perfumery and medicine. It is a

*At top: View of the native quarter of Zanzibar City.*

*Right: Two Swahili schoolboys.*

Photos by the author





*Fruit is produced in abundance. In this small shop in the Zanzibar market can be seen pineapples, bananas, grapefruit, oranges, limes, paw-paws and other local small fruits.*

*African women are highly skilled at making mats which they plait from local fibres. These Swahilis are dressed in bright coloured cloth which suits them well.*

preservative, an antiseptic and as a tincture relieves toothache. The Javanese and other Eastern races absorb most of the enormous output of cigarettes whose delicate aroma is due to the inclusion of cloves with the tobacco.

Being possessed of one of the finest ports in Africa, Zanzibar, the ancient gateway to East and Central Africa, was for many centuries the great market-place through which flowed most of the goods and merchandise of the interior.

Even in antiquity Zanzibar was chosen, notably by the Phoenicians and Arabians, as the most suitable emporium for trade on the eastern coast of Africa and it continues to serve as a storehouse where goods coming from the mainland are reshipped to Asia and Europe.

Second in importance to the clove as a local industry ranks the coconut. About 10,000 tons of copra form the annual export quota. Before the war most of this went to Marseilles and Genoa but during and since then exports have been controlled by the Ministry of Food. With the present world shortage of oils and fats the industry is in a flourishing condition. Zanzibar mills take part of the crop for the extraction of oil used in the manufacture of soap. In the south and east coast villages coconut husks are retted and made into coir rope by women. This rope is used locally for house building and other purposes but during the war large quantities of it were in demand for the manufacture of camouflage nets.

Apart from copra and coir, the coconut palm has many other useful products. The ripe nuts are consumed extensively as food by the native population. The leaves provide a durable thatch for huts and houses or may be woven into baskets. Although it takes nearly ten years for a coconut palm tree to mature it will continue to bear for thirty years and longer.

Tobacco, albeit of coarse and strong quality, grows well in the coral and sandy areas of Zanzibar. Part of the crop is consumed locally, mainly for chewing, and part is exported to Somaliland. The cured leaves are

*A wealthy Zanzibar merchant.*

Photos by the author



*An Arab with his donkey.*





A muscat dhow off Zanzibar. Photo by the author



Fishermen drag their double-outrigger canoes

plaited and wound into a roll somewhat resembling a catherine wheel, of eight to ten pounds weight.

Chillies are also grown with ease in the drier areas and form a small but useful cash crop which is being encouraged by the Department of Agriculture.

Zanzibar fruits, especially oranges, have a high reputation throughout the East African coast. Large quantities of these oranges were exported during the war for the use of the Forces in East Africa. They are thin skinned, sweet and juicy although often containing many seeds.

Bananas grow all over the island and many varieties are brought to market ranging from enormous cooking plantains to dainty "ladies' fingers". Pineapples grow particularly well in the Protectorate. Efforts to build up an export trade in canned pineapple were made just prior to the outbreak of war but had to be abandoned during the period of hostilities and have not yet been resumed. Mangoes of good quality are also produced locally. During the season there is a fair export of Zanzibar fruits by dhow to mainland ports.

As might be expected the war years witnessed a very great increase in food production which has since been well maintained. From sporadic cultivation of a few rice plots, mainly by old people, the area of land under rice has risen to over 20,000 acres and the growing of other food crops such as sweet potatoes, cassava, pulses and vegetables has also been considerably developed in recent years. Millet and maize are grown to a limited extent on the drier areas of Zanzibar and Pemba.

Zanzibar's population of about 200,000 is perhaps the most cosmopolitan in the British Commonwealth. The colourful pageant of life is made up by people from many lands —Arabs, Indians, Chinese and African tribesmen contribute to the romantic atmosphere of this port with its tiers of white Arab houses rising up from the deep blue waters of the sea, green garlanded to meet a sky as intensely blue as the sea below.

Besides the Swahili coast-men, an Arabized mixture of mainland tribes whose ancestors long years ago came trading to these parts and married negro inhabitants, there is a large colony of Indian traders, while



Outrigger canoes up the beach at Kizimkazi.



Examples of oriental ship-building in Zanzibar harbour.

Photo by the author

the pure Arabs form the upper class of plantation owners.

Through the steep and narrow streets, mediaeval in character, a motley crowd of pedestrians is ever passing, threading their devious ways in deep shadow and harsh sunlight between the ancient houses, the outstanding feature of which is the magnificence of their exquisitely carved doorways studded with heavy iron bosses.

In the crowded markets and bazaars, silk-mercers and goldsmiths, craftsmen in ivory and tortoise-shell, sword and dagger makers are seen at work in open shops or in the shadow of deep entrances. There are shops displaying brass and copper work, jewels and beads, rugs and carpets, and Indian potters, carpenters and wheelwrights ply their trades.

In the *shambas* (plantations) the women plait grass mats—very fine work in which various shades of dyes are used to produce pleasing designs. These dyes were formerly of vegetable origin from the fruit, bark, leaves or roots of local plants but imported dyes have now largely superseded them. Other articles made for use in the home are

various kinds of baskets, wooden spoons, sieves, cooking pots and beds.

Around part of the coast of these islands grow extensive areas of mangrove trees which provide quantities of excellent building poles while the bark has, of recent years,



A fishing canoe made from the hollowed trunk of a mango tree fitted with outriggers. The fisherman pushes the rudder handle with his back and uses a short carved paddle to turn his canoe.

been exported in considerable quantities to the United States of America for use in tanning.

Other trees such as the mango, Jack-fruit and a few local hardwoods provide timber for local craftsmen to use in the construction of doors and windows, bullock carts, canoes and sailing boats. Charcoal, which is widely used in the city of Zanzibar, is mainly obtained from the mango tree.

The coral which forms outerops throughout the eastern areas of both Zanzibar and Pemba, provides material for building and road making and considerable quantities of it are burnt to make lime. The fine arches, pillars, and plaster work of the old Arab houses of Zanzibar city and of numerous mosques bear witness to the excellent and durable lime mortar prepared by native craftsmen before the days of cement and concrete.

The shallow waters which surround the islands of Zanzibar and Pemba and abut on the deeps of the Indian Ocean, abound in fish of many types ranging from small whitebait to sharks and rays. The fishing industry is of great importance and provides a considerable amount of employment and the fish sold in town and village markets, or by itinerant cyclists, contributes a most valuable protein constituent to an otherwise

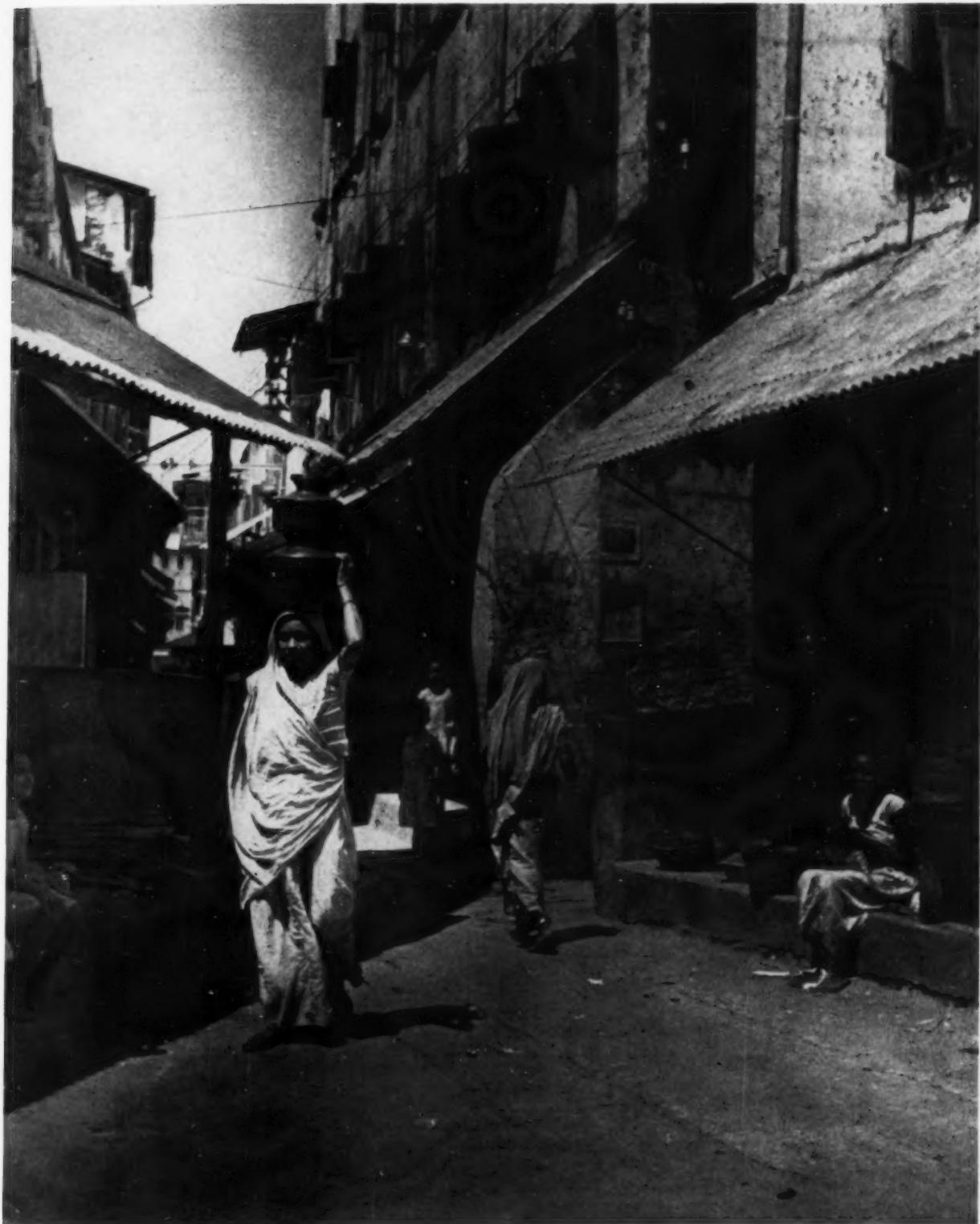
starchy diet. Lines, traps, nets, and even poison from the bark and leaves of trees, are employed in the various methods of catching fish. Where it is not possible to market the fish in a fresh condition it is dried and smoked round a small fire and, in this condition, keeps well for several days.

There are handicrafts associated with the fishing industry. From the huge trunks of mango trees beautiful canoes are skilfully cut out by craftsmen who produce most excellent work using the minimum of tools and equipment. Fishing lines are made from imported cotton, dyed and tanned with the bark of a local tree. Nets are manufactured from cotton, sisal, and other fibres, and range from the small circular throwing net to the long seine net of various meshes to suit the different places and purposes for which they are used. Fish traps are also woven from island material and are widely employed inside the coral reefs.

During the northeast monsoon, when the great dhows come south in fleets from Arabia and the Persian Gulf, Zanzibar's busy harbour assumes an even more picturesque appearance and presents examples of oriental shipbuilding, unchanged for centuries, unequalled perhaps in the world.



*Kibweni, H.H. the Sultan's country palace on the coast some five miles north of Zanzibar City.*



*Through the steep and narrow streets of the old town  
Zanzibar's cosmopolitan population threads its way. The  
Indian woman in the picture is carrying water in the vessel  
on her head.*

## BIRD SERIES — Part II

### AMERICAN BITTERN

Photographs and Notes by W. V. CRICH

*BOTAURUS LENTIGINOSUS* (Lat. *botaurus* new, from Fr. *botur* bittern; Lat. *lentiginosus* freckled)

**T**HE American Bittern is a rather slow-moving and sluggish bird which relies upon its protective coloration to escape detection. It has many other names, a few of which are: Stake-driver, Thunder-pump, Bog Hen, Indian Hen, or just plain Bittern.

When discovered, it erects itself and, with head and bill pointing straight upwards, remains motionless; it is then very difficult to see. Its yellowish-brown body and streaked plumage blend in colour-harmony with its surroundings.

The Bittern builds its nest in swampy and marshy places, placing it on the ground, or frequently on a tussock, completely surrounded by water. Unlike the herons it is more retiring in its habits and prefers to live a solitary existence. For this reason it is not often seen, even in those localities where it is fairly common. During the nesting season the birds are very close sitters, and will defend their nest against all comers. This they are able to do quite effectively by means of their javelin-like beak, which is as sharp as a needle. One nest I had under observation, when visited, was found to contain a dead adult on top of the nest. This must have been the work of a mink, because no other enemy could have parried the thrust of that beak so successfully.

The Bittern lays from three to five eggs. These are brownish and match the colour of the platform of dead cat-tails upon which they are laid. The adult incubates the eggs for about four weeks. After the eggs hatch the young remain in the nest for another two weeks. Even when only a day or two old, the young defend themselves most vigorously by jabbing their bills in the direction of their enemies. When the adult is approaching the nest through the cat-tails, her whereabouts can easily be determined by the dive-bombing Red-winged Blackbirds which share the same marsh as the Bittern.







## GREEN HERON

*BUTORIDES VIRESSENS VIRESSENS* (Lat. *butor* bitter, subgenus of heron *virescens*, Lat. *virere* to be green)

Photographs and Notes by W. V. CRICH

**G**REEN Herons are marsh birds familiar to hunter and fishermen alike, though they may be known to them only by one of their other common names, such as Green Bittern Fly-up-the-creek, Poke, or Minnow-fisher. They are to be seen flying low over a marsh, or crouched down on a lily-pad, or on a floating log, waiting the opportunity to seize a minnow or a frog whenever one of these may appear.

The Green Heron nests near water, either singly or in colonies. The nest is a very simple affair, consisting of a flat platform of sticks without any lining. It is a very flimsy structure, and the contents can often be seen through the bottom of the nest. Frequently several nests will be found in the same tree.

The number of eggs in a clutch may vary from three to nine. They are a pale greenish-blue, and have a smooth shell without gloss.

The young, even in their natal down, are quite active, and if disturbed haul themselves up out of the nest by hooking their bills and chins over adjacent branches and pulling themselves up with the additional aid of their feet. If cornered and approached too closely, the young Green Heron, like other members of this family, will regurgitate their crops. The smelly contents generally serve as a deterrent for those who are only mildly curious about the little birds. For the scientific ornithologist, however, this habit of the birds provides an opportunity to study its foods.

The food consists of various items, depending upon the locality. Minnows, crayfish, tadpoles, earthworms and insect larvae are some of the common items of diet.



The adult is distinguished by its small size, its rich yellow legs, the greenish colour of its wings, back and tail, and the chestnut brown colour of its neck and the sides of its throat.

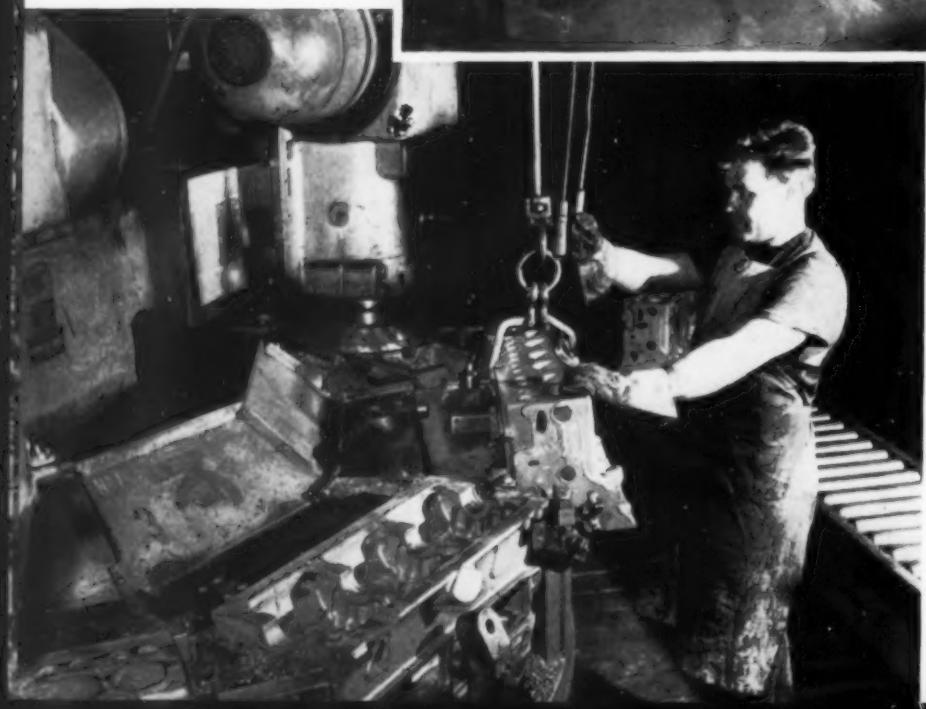
The birds pictured here were part of a colony in a tamarack swamp. An old mill-pond, one hundred yards to the south, supplied them with the necessary food. The colony consisted of about fourteen nests. To approach the nesting trees it was necessary to penetrate through soft, black muck with about four inches of warm, stagnant, mosquito-infested water on top of it. The trees, growing close together, were tall and spindly, with branches too delicate to support one's weight. It was necessary, therefore, to carry an extension-ladder along with our other photographic equipment. We had hardly left the edge of the swamps when we were almost mired. Both hands were used for carrying equipment and ladders, and our hip boots were soon pulled off our feet as we floundered in the sticky mud. The mosquitoes in clouds worked unmolested on our perspiring bodies. It took half an hour to reach the harder ground under the tamaracks, and when we did, we sank down exhausted, and wondered if it really was worthwhile. A cleat was nailed to an adjacent tree and the camera was fastened to this by means of a clamp. Remote control wires were run down to a blind, which was erected on the ground some distance away, and the nest was observed by means of binoculars from the blind. The Green Heron is a shy, secretive bird and it was only after a long wait that we succeeded in getting our pictures. Never have I seen mosquitoes so thick or felt the heat so much. We found later that we had chosen the hottest day of the year for our expedition. This, along with the hundred per cent humidity that existed in that swamp, made our heron-stalking the toughest assignment that we ever experienced in our photographing of birds.





*Canadian foundries supply the rough castings used in building the engines. These castings are machined to exact dimensions. Inspecting one of the rough block castings as it is received at the engine plant.*

*Extreme care is exercised at the engine plant to make sure that the engine blocks are absolutely clean when they reach the assembly lines. Ready to "dunk" an engine block into a bubbling bath of boiling water and soda which removes all filings and grease solvents.*



*Milling down the top and bottom of the rough casting is one of the first operations on the engine block as it starts on the long machining line. Placing one of the rough castings on the 35-ton milling machine.*

# **The Automobile Industry in Canada's Economy**

by LAWRENCE F. JONES

*The story of the automotive industry in general was presented in the JOURNAL in April 1937. The present article, in order to provide a more intimate picture, deals mainly with the experience of one corporation, inviting the reader inside the shop with a step-by-step photographic story taken specifically for JOURNAL readers a few weeks ago by Chrysler Corporation of Canada.*

**I**N A TINY SHOP in a Western Ontario city, nine employees are kept busy turning out a special kind of flexible tubing required by a large Canadian automotive manufacturer. More than one-quarter of this little firm's products are supplied to this one manufacturer.

Twenty miles away, a bigger concern is making die castings for the automotive firm. Forty per cent of the production of the 525 employees of this die casting company goes to the motor builder.

These two examples indicate, in a small measure, the importance of the Canadian automobile manufacturing industry to business of every kind, and, as a corollary, the importance of the firms which manufacture products needed in the production of automobiles and trucks to the automobile manufacturers.

The severity of Canada's shortage of United States dollars and the consequent demand upon Canadian manufacturers for many goods which had hitherto been imported from the United States has emphasized the importance of the vendors to Canadian automobile makers. The suppliers of automobile and truck parts and materials are called vendors by the car builders. They are the firms, some large and some small, who turn out the axles, the seat cushion cloth, the horns, the heaters and many other

items which go into the construction of automobiles and trucks, which the automobile manufacturers find it more economical to have supplied from outside their own plants.

In 1947 Chrysler purchased some seven thousand different items from well over three hundred Canadian manufacturers and producers for the production of its four makes of automobiles, two makes of trucks, for industrial engines and spare and service parts. The total value of these goods exceeded forty-two million dollars. They included raw materials, finished parts, tools, jigs and fixtures used for the building of a record number of vehicles. In the decade from 1938 to the end of 1947, this company has purchased goods to the value of more than three hundred and thirty-seven million dollars from Canadian vendors. Even in these days of astronomically high values, orders for goods worth that many millions are important and significant. Such orders are important to the economy of all companies which receive them; and to some represent the major proportion of their total business. Thus, because of mutual dependence, vendors are thought of as part of the organization.

Company purchases for the building of cars, trucks and engines in Canada contribute to the industrial activity, growth and prosperity, and affect the livelihoods of Canadian people in seventy-six cities, towns and villages in eight of the nine provinces, from Sydney, Nova Scotia to Sinclair Mills, British Columbia.

For geographical reasons, the majority of parts and products used in the manufacture of Canadian motor vehicles are produced in Western Ontario. Chrysler buys largely from companies located in such centres as

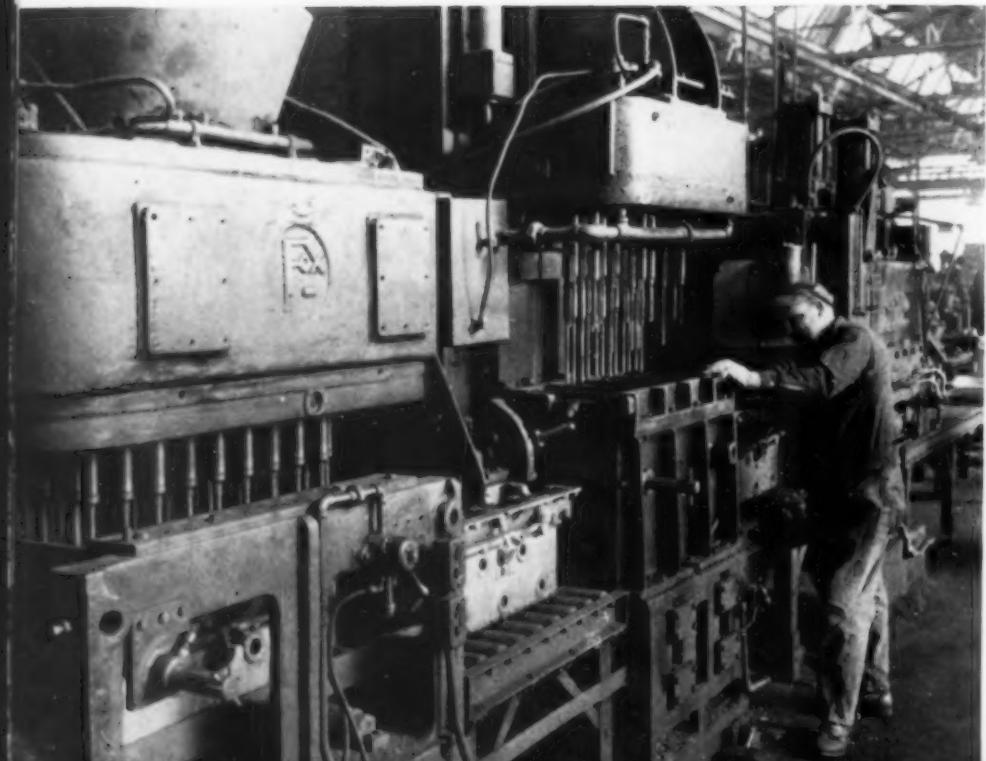


Toronto, St. Catharines, Sarnia, Chatham, Galt, Hamilton, Kitchener, Stratford, Merriiton, Niagara Falls, Ingersoll, and Wallaceburg. The Corporation, however, also places orders in many other Canadian communities. Plywood, for instance, is bought in British Columbia. Asbestos comes from Quebec. Aluminum, too, is purchased from Quebec.

It is doubtful if the average motorist fully appreciates the tremendous role which Canada's automobile industry and its associated businesses play in the economic life of the Dominion. Automobiles and trucks have been commonplace on the streets and highways for so many years that rarely does

*Top:—The engines used in the cars and trucks involve many operations. To ensure that the piston may be easily inserted in the cylinder bore, it is necessary to chamfer or bevel the top and bottom edges of the bore. Operator at work.*

*Centre:—The mirror-like reflection from the cylinder walls of the engine in this photograph is indicative of the precision work that has been done on the engine block since it was received at the motor plant in the form of rough casting. Preparing an engine block for the final precision honing operation.*



*A careful inspection is maintained on the operation of the automatic machine which drills the bearing cap holes, valve tappet holes and oil pan holes on the cylinder block in one operation.*

the motorist, or the pedestrian, give a thought to the repercussions that result from any interference with the steady, smooth flow of production from the assembly lines. Yet any economic obstacle which slows up or halts the production of cars and trucks can have a serious effect upon firms that are scattered across Canada, integral parts of village and farm economies whose output is vital to the automotive industry.

The building of motor vehicles in Canada is mainly centred in two Ontario cities, Windsor and Oshawa. But dozens of plants in other cities devote so much of their production to the automobile industry that



*Top:—An average of 360 Chrysler car and truck engines are manufactured daily at the Windsor engine plant. Operating an automatic machine which simultaneously drills the oil pump and distributor holes in the engine block.*



*Centre:—The cylinder bore of the engine blocks is carefully checked. Operating a machine capable of recording a variance in bore size of one-half thousandth of an inch.*

*The transmission, starter, carburetor, generator and distributor and all other parts are added to the engine as it progresses along the manufacturing assembly line. Prior to its first run-in test the complete engine is given a protective coat of paint in this spray booth.*





## CLOSE-UPS ON THE SUB-ASSEMBLY LINES

*Left page, top to bottom:—*

*The assembly line is the main artery of the car plant. Chassis frames are first put on the line upside down to facilitate the attachment of such parts as axles, rear springs and wheel hubs. These initial phases completed, the chassis is then turned rightside up, as shown here, in preparation for all subsequent operations. Chassis frames must be put on the line in sequence to synchronize with parts fed to the main assembly line by sub-assembly lines.*



*Engines for passenger cars and trucks are built in separate plants. An engine being installed on the chassis.*

*Metal Finishers preparing hoods for their journey to the paint baths and sprays. The hoods shown above each may be painted one of several colours to conform to the colours of the bodies for which they are designed.*



*Centre, top to bottom:—*

*An employee of 23 years standing, reaching for one of the hundreds of small parts used in assembling an instrument panel.*

*As each of the instrument panels is assembled, it is carefully checked before being installed. A department foreman checking the complex wiring system.*



*Seats for cars are assembled on a sub-assembly line and then fed to the main line for installation in cars. A complete department in itself, seats and cushions for all models are built here according to individual and specific daily requirements.*

*Right page, top to bottom:—Headlights are installed before fenders are carried by the conveyor to the main assembly line.*

*The final operation on the body assembly line is the installation of the radiator. Operator making sure that the radiator is properly lined up before securing it to the body. In the next operation, bodies are hoisted and carried to the main assembly line to be placed on the chassis.*

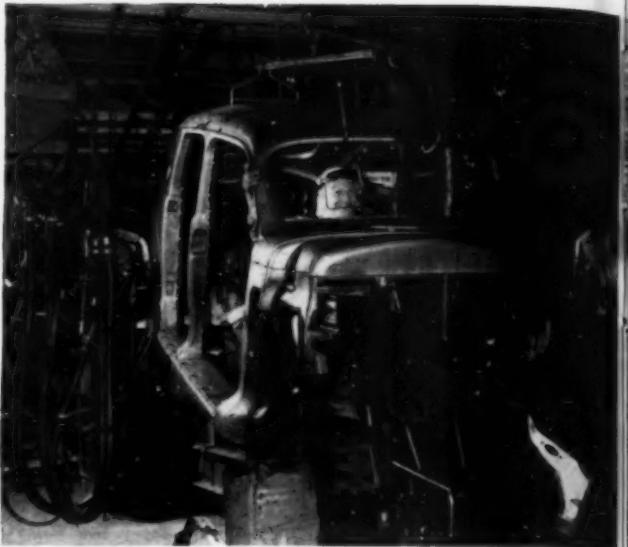
*Most eye-catching of sub-assembly lines is that on which the front section and rear fender are attached to the body. The photograph shows the concluding phase of this operation, car bodies being hoisted from near this point on to the chassis which move along the main assembly line.*

*In the background tires are being mounted on wheels and wheels sorted according to colour. In the foreground is the feeder line which carries the wheels to the main line. All wheels are placed on this feeder to arrive at the main assembly line at the precise moment they are required for installation on the chassis.*





*Many welding operations are required in the construction of a one-piece steel body. Operator doing some of the preliminary rough work on the windshield frame.*



*Interior trim retainers and a front dash are added to the roof body at this stage in the assembly operations.*

some of them might be termed "Motor Cities" as well as Windsor and Oshawa. Many million dollars worth of materials are purchased, of course, from factories right in Windsor and Oshawa. Toronto, too, because it is a major manufacturing centre and not too far from either of the two principal "Motor Cities", receives a very large share of the orders for motor vehicle goods.

Motor vehicle makers themselves build a great deal of the material which goes into a car or a truck. But the list of supplies taken from vendors is like a representative cross-section of the *Trade Index of Canada*.

To be more specific, let us again refer to some details of Chrysler requirements. Fabrics are a large item on the list; during the ten years from 1938 to 1947 inclusive, they used 9,488,136 square yards, or enough to cover 1,960 acres. These fabrics included body and headlining cloth, carpet, upholstering material, leather (both real and imitation) and waterproof duck. There was enough carpet material used in that period to provide an average rug, nine by twelve feet, for nearly 27,000 homes. In 1947 alone, the same corporation installed in its automobiles and trucks about 132,000 miles of



*Just prior to the body of the car receiving its first coat of paint, experienced metal workers give it a final inspection and touchup.*



*This octopus-like machine, known as a main assembly fixture, holds the parts in place while the sides are welded to the roof.*

wire, which is enough to stretch more than five times around the equator.

Paint, of course, is one of the biggest and most important necessities of the automotive industry. Last year, this company alone sprayed approximately 300,000 gallons of paints and enamels on its newly manufactured vehicles. That is sufficient to give every paved road and concrete sidewalk in the city of Toronto one good coat. Automobile bodies nowadays are all steel, and wood is no longer used for body supports, but between three and a half and four million feet of lumber was purchased last year for service boxes, export packing cases and other shipping purposes.

Glass likewise is an important component of an automobile. In the 1938-1947 period, the Company purchased 7,500,000 square feet of armoured and laminated glass for its passenger car and truck assembly lines. In 1947, they ordered 9,700 dozen pairs of canvas gloves for the use of their employees on production lines. It bought 123,700 abrasive disks for grinding wheels. It purchased 1,500,000 pounds of bolts, nuts and washers. There were purchases of literally thousands of other components, from lock washers to engine blocks and differentials, and including such varied necessities as oils and greases, tires, heaters, industrial alcohol,



*In his protective "Man from Mars" costume, a veteran employee is shown arc-welding a body front section.*

*Its supporting dolly-truck still attached to the endless chain conveyor system, the body is moved into the paint department for its initial undercoat.*





*When the car body emerges from the paint oven after receiving the first undercoat, it undergoes a series of sanding operations and inspections before entering the paint shop for the finishing coats of paint. Workmen water-sanding the body.*

chemicals, gaskets, cast iron, rivets, batteries, plastics, spark plugs, and scores of others.

To illustrate the importance of vendors to automobile manufacturers, here is a breakdown, by major components, of a  $2\frac{1}{2}$  ton truck, indicating the quantities of materials purchased by Chrysler from Canadian vendors:

	ONE TRUCK	ALL TRUCKS BUILT IN 1947
Steel	1,000 pounds	9,467 tons*
Cast Iron	428 pounds	3,717 tons
Brass and Copper	71 pounds	617 tons
Rubber	340 pounds	2,953 tons
Aluminum	10.3 pounds	89 tons
Glass (Cab)	2,872 sq. in.	49,886,640 sq. in.
Brake lining	392 sq. in.	6,809,040 sq. in.
Copper Wire	10,000 lineal ft.	173,700,000 lineal ft.

Here is a similar breakdown covering the major components of a four-door Plymouth sedan:

	ONE SEDAN	ALL PASSENGER CARS BUILT IN 1947
Steel	1,062 pounds	23,103 tons†
Brass and Copper	74 pounds	1,610 tons
Cast Iron	366 pounds	7,962 tons
Rubber	200 pounds	4,351 tons
Glass	4,132 sq. in.	179,775,056 sq. in.
Aluminum	9.6 pounds	209 tons
Brake lining	181 sq. in.	7,874,948 sq. in.
Copper Wire	12,000 lineal ft.	522,096,000 lineal ft.

#### ESTIMATED TOTAL FOR PASSENGER CARS AND TRUCKS

Steel	32,570 tons
Brass and Copper	2,227 tons
Cast Iron	11,679 tons
Rubber	7,304 tons
Aluminum	298 tons
Glass	229,661,696 sq. in. or 1,594,873 sq. ft. or 36.6 acres
Brake lining	14,683,988 sq. in. or 101,972 sq. ft. or 2.3 acres
Copper Wire	695,796,000 feet or 131,779 miles

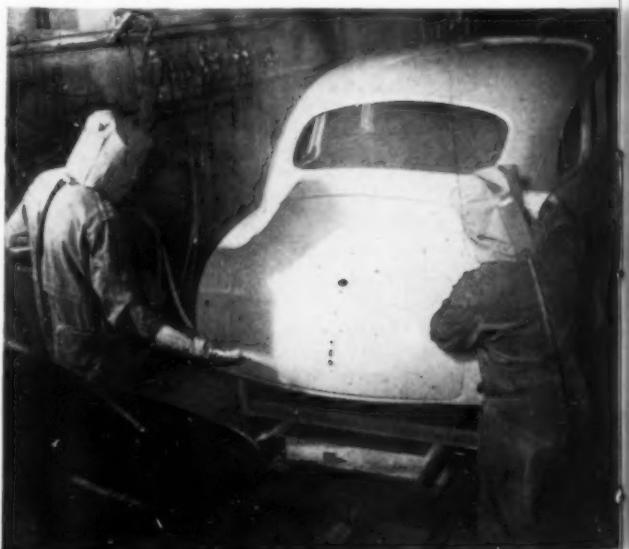
(Note: Total for steel items includes only the weight of such steel items obtained from Canadian vendors.)

\*Based on a study made on the  $2\frac{1}{2}$  ton truck built for civilian use in 1944 and corrected as far as possible to apply to 1947 models. Total 1947 production of trucks, 17,370.

†Based on estimate of component parts of Plymouth four-door sedan. Total 1947 production of all passenger cars, 43,508.

It is the settled policy of the Chrysler Corporation of Canada Limited to use in its products as many Canadian-made parts and materials as possible. That has been the policy for a long time. The management is always looking for Canadian products that can be incorporated in the manufacturing of cars and trucks. At one time, engines were imported. In the late 1930's it was decided

*Its prime coat rubbed down to produce a satin-like finish, the body then enters the final paint spray booth.*



to construct an engine manufacturing plant at Windsor. This was completed in 1937-38 and it is estimated that this plant today could not be duplicated for many millions of dollars more than its original cost. The crankshaft equipment in the engine plant now is worth twice what the building itself cost to erect. Approximately one hundred pieces of machinery for the production of engines have been installed in the past ten years, at an average cost of from nine to ten thousand dollars each.

The problems confronting a Canadian automotive manufacturer are much more complex than those which face the American motor maker. For example, Chrysler of Canada has a plant in which can be turned out on one assembly line different engines for four makes of cars. In the United States, each of these four has its own engine manufacturing plant. The same situation exists at the automobile manufacturing plant at Windsor, where all four makes of car are produced on one assembly line, while in Detroit there is a separate plant for each.

It may be asked why Canadian automotive builders do not have separate plants for the production of each of their products. The answer to this is simple. The Canadian market for motor cars and trucks is small in comparison with that of the United States. Modern assembly line production is dependent for its success upon volume, in order that the price to the consumer may be reasonable, consistent with high quality. If there were four separate manufacturing plants for one corporation alone, then volume would be so reduced that the advantage of low-cost assembly line methods would be lost, and the price of the finished product would be prohibitive to most purchasers of motor vehicles in this country.

In addition to this particular problem, the Canadian motor vehicle company today has

*To the layman one of the most interesting operations occurs when the car body is dropped on the chassis. Close-coupled scheduling is required to ensure the arrival of the four-mile long assembly line of the right part at the right time.*



*Stretching almost as far as the eye can see, this line of automobile bodies is moving steadily along the "trim" assembly line. Overhead and side upholstery, windows, door handles, window shields, instrument panels and many other parts of the new car are installed as the body moves along this line.*





*Left page, top and bottom:*—

*Completely built cars roll off the line at the rate of one every two minutes. All models on the same line at the same time. Every car is inspected and tested for needed adjustments the moment it leaves the line. Testing for speedometer accuracy and oil gauge pressure.*

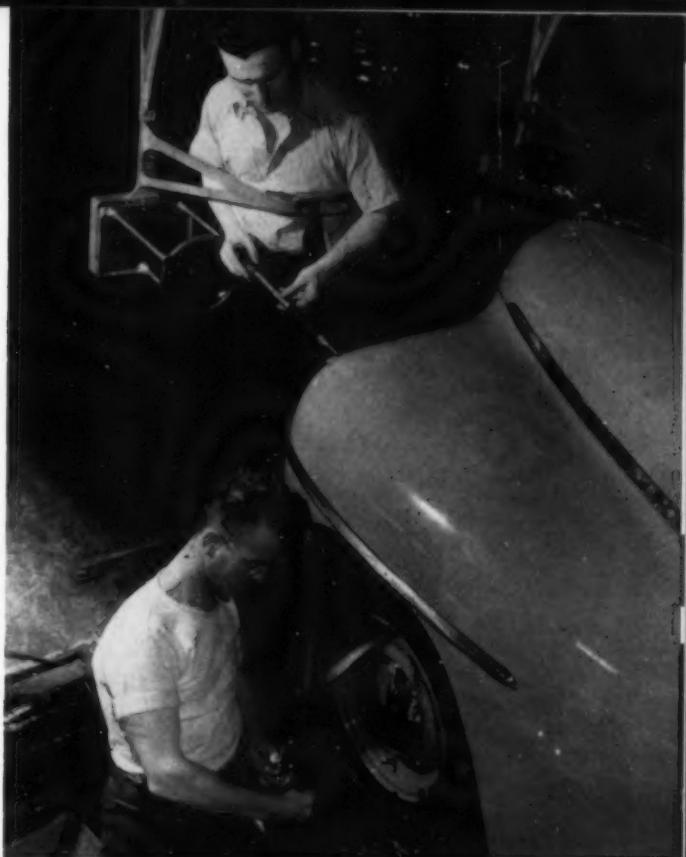
*Among the many tests cars are put through after leaving the assembly line is that which allows accurate lining up of the front wheels. Testing centre steering and toe-in adjustment.*

*Right page, top to bottom:*—

*Complementary to the toe-in adjustment is what is known as camber adjustment, a test designed to arrive at what might be called "perfect steering geometry". Windsor-made, these expensive testing machines set up wheels to give maximum tire wear, easy steering, etc. Headlight focussing is also tested at this point. Above, checking headlights, and below, operating the camber adjustor.*

*Several cars a day are checked for air leakage in car bodies. This involves taping all openings with special adhesive tape, mechanically creating a partial vacuum inside the car and determining from the air gauge the amount of leakage. This system pin-points leakage sources. When leakage is found, corrective action is taken. The test is particularly important to prairie farmers who live where dust often is more annoying than mosquitoes.*

*Every car undergoes a water test which simulates driving rain before it leaves the plant. Car in the foreground is being pressure sprayed from all sides to detect any previously undetected leaks in the body. As soon as it moves on, the one behind will be driven under the spray. Cars are washed again with hot water on the final approval line.*



the difficulty of definite limitations upon the extent of American content in his car or truck. There are parts and materials which it is not possible to buy in Canada and which it would not be feasible to attempt to make in Canada, because the cost of production would be uneconomical for such a restricted market. The government of Canada has taken cognizance of this fact, and the automotive industry is permitted to import these essential goods.

The industry, however, is not satisfied to do that alone. It is constantly searching for sources of supply in Canada. Here is an example of what that means: the Chrysler Corporation at one time imported from the United States all the heaters installed in its automobiles and trucks. Then, because of shortages of materials in the United States, the heaters became difficult to get. The Company found a manufacturer in a Canadian city who could do the job required. Engineers of the two companies conferred, and the result was that the small concern began producing all the heaters required. The heater manufacturer has since expanded his organization and built an addition to his plant to handle this new business.

It must not be forgotten that the Canadian vendors are themselves large purchasers of raw materials from which they fashion the products which the motor vehicle manufacturer needs. The firms which make fabrics, batteries, clutches, rubber mats, cardboard foundations, springs and the countless other components of a motor vehicle turn to vendors of their own for materials and goods with which to make the finished products. Thus, an order from an automotive manufacturer goes far beyond the primary vendor.

Along an almost limitless chain of employment, Canadian workers, whether they realize it or not, are working for the motor industry.

How many men and women are dependent upon the motor vehicle industry for their livelihood is difficult to compute, because so many varying factors enter into such a calculation. It is not easy to determine what percentage of a job a factory worker may be doing on behalf of a motor car manufacturer when the product he is working on may go through one or two additional processes before it reaches the ultimate user. The Chrysler Corporation of Canada Limited, which employs approximately 4,800 men and women, provides a livelihood for 35,200 employees in associated businesses. In addition there are 1,500 Chrysler dealers in Canada who employ more than 11,100. The pay envelopes of over fifty thousand people represent purchasing power on which many others are dependent.

Growth of a great industry like that of automobile manufacturing is of paramount importance to Canada. This comparatively youthful business involves the use of Canadian materials from mines, forests, fields and factories, giving employment to scores of thousands, and providing food, shelter and the comforts of life to hundreds of thousands who are dependent upon these workers. Only as stable industry grows within the borders of Canada can Canadians enjoy the benefits and prosperity of the higher manufacturing processes. The automotive industry of Canada is one of the most virile of all the industries which will lead Canadians to a higher industrial destiny.





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#### AN ANNOUNCEMENT

**I**T is with pleasure and pride that The Canadian Geographical Society announces publication of its new Provincial Geographical Aspects booklets. Printed on the same quality paper and page size as the "Journal" the set comprises nine booklets, each presenting in graphic form the varied geographical aspects of one Canadian province. Each booklet contains 32 pages, is profusely illustrated and has a map of the province. The subject is treated in comprehensive manner, touching on historical, physical, economic and human aspects of the province, with sections on topography, climate, natural resources, industries, cities, etc. Leading authorities in every field have collaborated in preparation of the articles and the result is a concise, reliable, up-to-date survey of Canada from coast to coast. In order to be of maximum usefulness the booklets are written in simple language within the range of school children.

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**EDITOR'S NOTE-BOOK**

For biographical sketch of Robert J. C. Stead see April 1948 issue.

\* \* \*

E. O. Hoppé has spent a large part of his life in the lesser-known parts of the world and there are few countries that intrigue the imagination that he has not visited. Mr. Hoppé has recorded his experiences in numerous interesting travel books illustrated by his own photographs. Born in Germany, educated in Paris and Vienna, living in England, Mr. Hoppé early developed an enthusiasm for photographs, to which much of his life has been devoted. Experimental work and revolutionary methods were pursued in the conviction that photography should be recognized as an art medium. His confidence has been justified, many of his photographs being acquired by national art galleries and museums.

\* \* \*

For biographical sketch of W. V. Crich see July 1948 issue.

\* \* \*

Lawrence F. Jones is a native of Kingston, Ontario, and was educated in Ottawa schools. Later he attended the School of Journalism at Columbia University. For twenty years he was engaged with Ottawa, Montreal, New York and Toronto newspapers as reporter, foreign correspondent, and in an editorial capacity. He is now public relations counsel with Editorial Services, Limited, Toronto.

\* \* \*

**COVER SUBJECT:**

**SCREECH OWL**

*Otus Asio Naevius* (Lat. *otus* horned owl).

*asio* screech owl, *naevius* having a mark, blotch)

Photographs and Notes by W. V. Crich

THE SCREECH OWL is our only small owl with ear-tufts. There are two colour phases—the bird is either light reddish-brown or brownish-gray, with a streaked breast which resembles the pattern of broken bark.

Its nest is found in a natural cavity and is lined with feathers, leaves, or grasses. The Screech Owl is a permanent resident in New Brunswick, Maine, Ontario, southern Manitoba, Wisconsin, and south to the highlands of Georgia, Alabama, eastern Oklahoma, northern Arkansas.

Its silent moth-like flights and its tremulous wailing call have made it a bird of ill omen to the minds of the unlearned and simple. To them it signified disaster, disease, or death. Screech owls are not usually offensive, and will not attack a human unless the nesting place is approached too closely, when the bird will swoop down as if to attack in order to frighten the intruder. Although it preys on small birds, except in the case of individual raids on bird-houses, the Screech Owl cannot be considered harmful. Much of its diet consists of mice and insects, many of which are harmful pests.

To find its nest or resting cavity, one should look for holes in trees. To discover whether the nest is occupied, run the fingers quickly up the bark, making a sound like the scurrying feet of a small mammal. The owl, if at home, mistakes this sound for a weasel, and quickly leaves its abode. No amount of pounding, however, could force it from its retreat.

\* \* \*

**AMONGST THE NEW BOOKS**

*Canada's New Northwest*

published by the North Pacific Planning Project  
(King's Printer, Ottawa, \$1.00)

A SIGNIFICANT contribution to the growing authoritative literature on Northern Canada has been made by the appearance of *Canada's New Northwest*. This booklet, "a study of the present and future development of Mackenzie District of the Northwest Territories, Yukon Territory, and the northern parts of Alberta and British Columbia", is the result of research and co-ordination carried on by a federal organization known as the North Pacific Planning Project at Ottawa.

The project was inaugurated January, 1943, as a joint effort of the United States and Canada to carry out an inventory of the natural resources and assess their potentialities in the future development of north-western North America. The United States withdrew from the Project in 1944, but the Canadian group continued their study. The Department of Mines and Resources organized field parties to bring back factual information on geology, mineral resources, forests, water power, wildlife and recreational resources. The Department of Agriculture investigated soils, and agricultural and horticultural possibilities during three summers. The Department of Fisheries reported on the potentialities of the fresh-water fisheries.

Dr. Charles Camsell was named Canadian Director of the Project, and Mr. R. K. Odell was appointed Assistant Director to plan field investigations and co-ordinate the activities of various government departments. Reports were written by twenty-five government officers, each a specialist in his field. In order to co-ordinate these reports and to give a sound over-all picture of the region, Mr. M. W. Maxwell was loaned to the project by the Department of Research and Development, Canadian National Railways. Mr. Maxwell abstracted the government reports and did most of the final editing and writing of the book.

The book has chapters on physiography and geology, agriculture, forests, fisheries, water power resources, transportation, wildlife conservation, population, meteorology, and conclusions. Several large and excellent new maps have been specially prepared for the report, and are folded into the text. The report deals only with the Canadian part of the Northwest, a large region of one million square miles, but does not overlook the influence of economic factors in nearby Alaska.

Chapter 1 outlines the physical base of the area. The topographic description, based on recent aerial photographs, is more reliable than earlier published accounts based on exploratory expeditions. The section on mineral resources discusses in some detail the development of the mining industry in the Northwest and describes the widely-scattered extent of present activities. The expansion of the mining industry is due to increased accessibility in recent years, and will be encouraged by the availability of aerial photographs. Much of the future development of the whole region hinges on a successful mining industry.

Chapter 2 discusses the agricultural possibilities of the region. Whether the Northwest can feed itself will influence other industries by reducing the cost of imported food. An estimate of the amount of suitable farm land is also an aid in determining the future population of the region. The southern part of the region, which includes the Peace River country and the railway belt of British Columbia, has a well-established agricultural industry. Further expansion is possible if road and rail extensions are made and markets become available. Conflicting reports have been circulated in the past as to the potentialities of the Yukon and Mackenzie valleys, but the experts do not see the basis for great expansion. Crops can grow in the Northwest where soil is suitable. Gardening has been carried on for over a century, but topography and drainage limit the extent of continuous farm blocks.

The total area of known soils suitable for cultivation in the whole Northwest is 15 to 16 million acres. This amounts to about one-seventh of the occupied agricultural land of the Prairie Provinces. In attempting to arrive at an estimate of the potential population of the Northwest the figure of  $15\frac{1}{2}$  million acres is used. If the population density approached that now found in the Prairies—which might be possible under less extensive farming methods—the Northwest could support a maximum population of 300,000 to 400,000 people.

Many writers have written optimistically about the vast unsettled acres in Northern Canada, or pessimistically about the harsh winter climate and muskeg soils. Unfortunately, many of these writers have never seen the North, or at least have not studied it scientifically. It is well for Canadians to consider carefully the population estimates contained in *Canada's New Northwest*. They are based on the judgment of men who have seen and analysed the influence of topography, climate and soils; who have studied the possible impact of different economic conditions; and who have considered the whole region as

a part of the settlement pattern of Canada. The estimate is sound in pointing out the considered potentialities of the region, and it is useful in warning of the dangers of over-emphasizing the value of our Northern resources. The resources of the North are extractive and support relatively few people. Agriculture, the basis of permanent population, although possible, is more limited in extent than the large area indicates.

Chapter 3 on forests considers the extent of potentially commercial forests. The best timber is found on the Queen Charlotte Islands, and this is already being cut. Extensive stands, at present inaccessible to markets, are located along the Liard River Valley of northeastern British Columbia and southeastern Yukon. In addition to containing potential construction material, the forests are valuable as fur preserves and for scenic and recreational purposes.

The fisheries of the coastal regions and interior are discussed in Chapter 4. The known resources of salmon and halibut utilized on the west coast are in contrast to the little-developed inland fisheries. As a result of investigations, commercial fishing has begun in Great Slave Lake and the extent of expansion has been estimated for local fisheries in the Mackenzie and Yukon rivers. It is doubtful if a commercial fishery could be supported by the cold, clear waters of Great Bear Lake, even if a market could be reached.

Water power resources are incompletely known, since the few industries of the region have not warranted more detailed investigations. The greatest reserves are located in the coastal and central interior of British Columbia. All parts of the Northwest, however, have potential power sites which could be developed if local industries arise.

Transportation, as described in Chapter 6, is the key to future development of the Northwest. Because of its varied topography, wide climatic range, scattered and diverse resources, and scanty population, the transportation problems are complex. Water transport served the area for over a century and still carries the bulk of the freight. Air transport has opened up the previously inaccessible areas, and carries much of the express and personnel traffic. All-weather roads, such as the Alaska Highway and new Hay River road, are further aiding the region, but their exact value to freight movement has not been determined. This chapter fully discusses the facts of the present transportation system in the Northwest, and evaluates proposed extensions.

Fur production, Chapter 7, is still the leading industry in most of the Northwest. Its conservation and protection is necessary for the welfare of the native inhabitants. Big game is adequate at present in the mountainous regions, and is an attraction for tourists.

The distribution and composition of the population are presented in Chapter 8. About 120,000 people live in the one million square miles, half of them in the Peace River country. There are only 15,000 inhabitants in Yukon Territory and Mackenzie District, about one-

(Continued on page X)



(Continued from page IX)

third of whom are natives. Future expansion in population is expected to be in the already settled areas of Peace River district, and the railway belt of British Columbia. When these areas are more fully settled the Yukon and Mackenzie valleys will experience increased settlement other than that concerned with mining.

Most geographers will probably feel that the final chapter, Meteorology and Climate, might logically have preceded agriculture and forests in presentation. The chapter is a scientific treatise on the climatic controls and air mass movements in the Northwest. The facts illustrate that the climate, although characterized by cold winters in the interior, has moderate summers which are not discouraging to either agriculture or settlement.

*Canada's New Northwest* will become a valuable reference book for those interested in the orderly development of Northern Canada. It contains the basic facts concerning physical geography and resources. It expresses the considered opinions of experts who have studied the potentialities of the region. It is not a final study, for much is yet to be learned and additional knowledge is being accumulated daily. From the mass of fact and opinion being published on Northern Canada, this reviewer recommends *Canada's New Northwest* to those interested in knowing facts.

J. LEWIS ROBINSON

\* \* \*

*A Russian Journal*

by JOHN STEINBECK

(Macmillan, Toronto, \$4.50)

John Steinbeck set out to find out about the Russian people and to provide an unbiased report. With him went photographer Robert Capa. They did not seek the politicians and diplomats, but the people on farms, the workers in factories, the women doing their shopping, the men rebuilding their homes. Being the writer that he is, Steinbeck's account is eminently readable, and entertaining, and the numerous photographs by Capa are an integral part of the book. The interplay of their two personalities in the course of their travels to Moscow, Stalingrad, Kiev, the Ukraine and Georgia takes rather a large share of attention—but adds to the liveliness of the book. The intimate descriptions of meals at farm houses, dramatics at the village club, receptions by the Writers' Union, how the people amuse themselves in the parks and at dances, and how they live in holes beneath the rubble of their cities are vivid and human. And what they found was that the Russians are people much like any others, whose first thought is for peace and security; who are concerned with obtaining buildings to live in, supplies of food to eat, keeping clean, and bringing up their children as well as they can. People who are curious about the attitude of the outside world towards them. This seems to be an account without prejudice about the ordinary Soviet man and woman—somewhat of a unique achievement in the present day and age.

M.B.

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